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ABSTRACT:

Know the building code to understand when the use of wood preservative treatment is required. Avoiding the requirement for preservative treatment simplifies fastener and connector selections and helps avoid the need for stainless steel.

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06 05 73 Wood Treatment
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KEYWORDS:

Wood, pressure treated, preservative, alkaline copper quaternary, ACQ, copper azole, borate, sodium silicate, termite, retention rate, galvanic corrosion, fasteners, connectors, moisture content

REFERENCES:

ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
AWPA U1 - Use Category System - User Specification for Treated Wood
IBC - International Building Code 2009 edition

Preservative Treated Wood

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What is Required?

Often drawings note wood as treated or pressure treated. This note is confusing because wood is treated for two different purposes: preservative treatment or fire-retardant treatment. When wood is labeled as treated, which one is it? It matters.

The International Building Code (IBC) 2009 sections 1403.5 and 2304.11 require naturally resistant or preservative treated wood for locations shown in Table 1 to ensure the wood does not decay from moisture exposure.

Naturally Resistant Wood

Naturally resistant wood species are limited. IBC lists heartwood of redwood, black locust, and cedar as naturally resistant species. Additional information about durable wood species is available in "Natural Durability of Wood: A Worldwide Checklist of Species" by T.C. Scheffer and J.J. Morrell that lists wood species by region and relative

durability. The checklist shows hickory, juniper, oak (blackjack, chestnut, post and white), and yew as other durable North American species.

Preservatives

IBC does not specify the type of preservative. The code requires compliance with AWPA U1, Commodity A for sawn products and Commodity F for composite products. This standard allows many options for the preservative, depending on the end use, wood commodity, and wood species. If a particular preservative is required, it must be specified. Common preservatives used to protect wood against decay are: copper compounds, borate compounds, or sodium silicate. The copper compounds are the most prevalent treatments used in the United States. Alkaline Copper Quaternary (ACQ) is the most common treatment. This compound contains high levels of copper. Copper is very corrosive to steel fasteners. The galvanic difference between copper and steel

Table 1 - Preservative Treated Wood Code Required Locations

- Below design flood elevation
- Floor framing and subfloor less than 18 inches above exposed ground
- Framing and sheathing on foundations less than 8 inches above exposed earth
- Framing and furring attached directly to the interior of below grade masonry
- Sleepers and sills in concrete in direct contact with earth
- Girders pocketed into exterior concrete or masonry walls without an air space
- Wood siding when less than 6 inches above exposed earth and less than 2 inches above exterior horizontal surfaces
- Posts and columns supported by a concrete or masonry slab on grade
- Laminated timbers exposed to weather and part of the building structural frame
- Wood in contact with the ground or fresh water
- Posts and columns embedded in concrete in direct contact with earth or exposed to weather
- Structural supports exposed to weather
- Retaining walls and crib walls

and between copper and zinc used for galvanizing steel is large, and the AWPAs required retention rates (Table 2) are greatest. So, steel fasteners corrosion is likely

Copper Azole, another copper compound used in the United States is available in two forms Type B (CA-B) and Type C (CA-C). These compounds are less corrosive to dissimilar metals because the AWPAs retention rate is significantly less than ACQ.

Borate compounds (SBX) are preservatives that pose no galvanic corrosion potential for fasteners because they are non-metallic. However, they are water soluble and can leach out of wood when exposed to moisture. Therefore they can be used only above grade and in dry locations. SBX retention rates in Table 2 are based on the potential termite exposure. Formosan termites are common in the gulf-coast states and Hawaii and require greater retention rates.

Sodium silicate preservatives that fuse sand and sodium to form a glass like substance are available, but are not recognized by AWPAs U1. Therefore these compounds do not meet the IBC product requirements for wood preservatives.

The preservatives above are water borne. When wood is pressure treated, the wood is injected with water, causing the wood to swell, and increasing twisting and checking. After treatment, the wood will be near saturation, or 25% moisture content.

Fasteners and Connectors

IBC (2304.9.5) requires fasteners and connectors for preservative treated wood to be hot-dipped galvanized steel, stainless steel, silicon bronze or copper. Fastener galvanizing must comply with ASTM A153. Class D coating (1.00 oz/s without specific manufacturer recommendations, it may be prudent to specify stainless steel to be safe. IBC includes one galvanizing standard for all preservatives. Yet testing reported by connector manufacturers indicates significant corrosion differences among the preservatives. Yet testing indicates significant corrosion differences among the preservatives, copper being the worst. When the wood is exposed to moisture or water, corrosion will be accelerated. And without specific manufacturer recommendations, it may be prudent to specify stainless steel to be safe.

Conclusions

Identify wood products as preservative treated or fire-retardant treated instead of just treated or pressure treated.

Avoid preservative treatment where possible. Ensure wood framing, sheathing, and siding are installed at heights above grade and exposed earth to eliminate the code's control of the condition.

Allow for construction tolerances to ensure expensive field fixes are not needed. Use 12 inches above grade

instead of IBC required 8.

Coordinate fastener requirements for siding, roofing, flashing, and other components secured to preservative treated wood.

When preservative treatment is required, specify the wood as kiln dried after treatment (KDAT) with 19% maximum moisture content to ensure dimensional stability.

Preservative	Above Grade	Ground Contact
ACQ	0.25	0.40
CA-B	0.10*	0.21
CA-C	0.06	0.15
SBX Non-Formosan	0.17	N/A
SBX Formosan	0.28	N/A
* 0.11 retention is required for plywood		

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